

January 15, 2013

Ms. Sharon Fang, P.E.
U.S. Environmental Protection Agency
Region 3
1650 Arch Street
Philadelphia, PA 19103

**Subject: North Penn Area 5 Superfund Site Remedial Design Oversight
Work Assignment 053RORD03W6
Review of Geosyntec's North Penn 5 Intermediate (60%) Design Submittal**

Dear Ms. Fang:

In accordance with your directions and Task 8 of Work Assignment 053RORD03W6, HydroGeoLogic, Inc. (HGL) has reviewed the Intermediate (60%) Design Submittal / Pre-Design Investigation Report/Preliminary Remedial Design prepared by the potentially responsible parties (PRPs) for Operable Unit 2 (OU2) of the North Penn Area 5 Superfund Site. HGL has the following comments on this document:

General Comments

1. Complete a thorough editorial review, as numerous instances of awkward wording and grammatical errors were observed throughout the document.
2. Section 3 presents the soil results but does not evaluate whether the TCE detections could represent historical sources of contamination associated with the plume. Please provide an analysis of the soil data.
3. Present a contingency approach that will be used to achieve the RAOs in case Phase 1 results are determined to constitute a failure and Phase 2 is not implemented.
4. The treatability study data analysis concluded that a buffered EVO amendment is required. For the treatability study, buffering was provided through sodium bicarbonate addition. Section 5 specifies how much EVO solution will be required, but does not discuss how this solution will be buffered. Will sodium bicarbonate or some other buffer be added to the EVO solution to reflect the findings of the treatability study that the buffered amendment outperformed the unbuffered amendment addition. If so, how much buffer will be included in each batch of EVO solution?
5. The design radius of influence for the injection trench is 50 feet. Given the low permeability of the soils encountered, this might be optimistic. Additionally, from the description of the overburden monitoring well network in Section 8.2.1, it is not clear that any of the wells will be positioned to confirm that the amendment influence extends 50 feet from the trench. On the contrary, the detail on Drawing 3 of Appendix H indicates that all of the new overburden monitoring wells to be used in Phase 1 are located within 25 feet of the trench. The text in Section 8 indicates that the new

overburden wells will all be within 20 feet of the trench. On Drawing 3 in Appendix H wells RI23 and RI25 appear to be farther than 50 feet from the application trench and are placed closer to the trench ends where the document indicates that the affected radius will be smallest. Please describe how the planned monitoring program will confirm the design radius of influence.

6. Please indicate how much KB-1 inoculum will be added to the trench and the basis for the quantity.
7. Please indicate how the trench spoils will be managed, including how saturated spoils will be decanted, how spoils will be stockpiled and managed pending waste characterization and disposal, and how backfill will be stockpiled. Further, the site layout map (Drawing 3 of Appendix H) should indicate the location of the spoils management areas and laydown yard.
8. Discuss the potential impact of the trenching on the Constantia building and other surface features. Include a structural analysis of the soil in the area of the building.
9. Indicate that all wells will be constructed developed, and abandoned in accordance with all applicable Pennsylvania well drilling regulations and EPA guidance for groundwater monitoring well construction.
10. Using the analytical results from only one sample to provide the geotechnical characteristics for the entire site is questionable from an engineering standpoint. Consider performing additional geotechnical analyses to ensure that the observed characteristics (particularly permeability) are applicable to the whole site.

Specific Comments

1. Page 5, Section 2.1.2, first paragraph – The description of the overburden as being between 10 and 40 feet thick appears to be inconsistent with the information contained in Table 1, Table 7, Figure 9, and Section 2.1.3. Overburden thicknesses listed in Table 1 and derived from Table 7 and Figure 9 show a maximum of approximately 30 feet (at TW-10). Please verify the thickness of the overburden and correct the text as necessary.
2. Page 5, Section 2.1.3, first paragraph – Given that groundwater occurs at the bedrock/overburden interface, the language in this section indicates a maximum overburden depth of 20 feet. Please review the following language and correct/clarify as needed: “The thicker sections of overburden, such as those in the vicinity of the former BAE and former Stabilus properties, have historically contained a saturated zone of approximately 3 to 10 feet in thickness year-round. The depth to groundwater in this overburden unit has historically ranged from 4 to 10 feet below grade.”
3. Page 5, Section 2.1.3, second paragraph, first sentence – The overburden groundwater elevations shown on Figures 11, 12, and 13 also decrease moving from northeast to southwest. Provide an explanation of why the potential southwesterly movement of groundwater is being discounted.
4. Page 11, Section 3.1, last bullet – Please correct year date 2012 to 2013.

5. Page 12, Section 3.2.1, last paragraph on page – Please explain why step-off locations were not advanced for TW41, TW42, and TW43.
6. Page 13, Section 3.2.2, second paragraph – Consider revising the last sentence of the second paragraph; it is confusing.
7. Page 13, Section 3.2.2, second bullet – Please clarify the meaning of the phrase “stabilized water level greater than 0.3 feet” at the end of the last sentence. Is this intended to mean drawdown greater than 0.3 feet?
8. Page 13, Section 3.2.2, first sentence of last paragraph – Replace “observation of first water” with “infiltration of groundwater” to clarify the statement.
9. Page 14, Section 3.2.2, last sentence – Change the word “sampled” to “samples”.
10. Page 15, Section 3.2.4, second paragraph – Replace “has been delineated as shown on Figure 6” with “is shown on Figure 6.” The word “delineation” implies that the plume boundaries have been defined. As shown on Figure 6, the plume is not defined to the TCE MCL west or north of the westernmost sample locations.
11. Page 15, Section 3.2.4, third paragraph – Recommend collecting samples north of TW45, which has an unbounded TCE detection of 34 $\mu\text{g/L}$, north of TW49, and west of TW51.
12. Page 15, Section 3.2.4, fourth paragraph – Eliminate this paragraph. The DCE and TCE concentration data do not necessarily indicate the presence of “two distinct sources”. There are no gaps in the TCE or DCE plumes, and the single result from TW04 (which shows almost 500 $\mu\text{g/L}$ of TCE and 58 $\mu\text{g/L}$ of DCE) should not be used to conclude that there are two distinct sources. The somewhat lower concentrations at the TW04 location could also be the result of heterogeneity of the bedrock (no fractures in the area) or overburden.
13. Page 16, Section 3.3.1, first paragraph – Change “no measure” to “no readings”.
14. Page 17, Section 3.3.3, first paragraph – Delete the word “marginal” from the second sentence. Based on the data on table 6, SSL for TCE was exceeded at locations SB02 through SB09, but the text indicates that the sample from SB01 also exceeded the TCE SSL. Correct the text to reflect the table so that they are consistent. Separately, the MCL-based SSL is more than an order of magnitude higher than the risk-based groundwater protection SSL. Provide the rationale for using the higher number.
15. Pages 18 and 19, Section Headings 3.5, 3.5.1, and 3.5.2 – Change “Groundwater Monitoring” to “Groundwater Elevation Monitoring”.
16. Page 20, Section 3.6, last sentence – Eliminate the word “planned” if the microcosm construction, incubation, sampling, and analysis were carried out as indicated in the 30% design. Otherwise, indicate any method variations and reasons for the variations.
17. Page 21, Section 3.7, first paragraph, first sentence – Please revise to avoid the implication that the TCE plume boundary has been delineated. As shown on Figure 6, the plume has not been defined to the TCE MCL along its western boundary and north

of TW45 and TW49. If delineation is referring only to the 100 $\mu\text{g/L}$ contour, then this definition of delineation needs to be clarified in the report.

18. Page 21, Section 3.7, first paragraph – If groundwater flows predominantly along the overburden/bedrock interface as stated in the text, please explain the groundwater flow directions shown on Figures 11, 12, and 13, which are approximately perpendicular to the trough. This clarification is also important given that groundwater elevations also decrease toward the southwest.
19. Page 21, Section 3.7, first paragraph – Why was a maximum saturated thickness of 5 feet assumed? Section 2.1.3 indicates that saturated zone thickness has been historically between 3 feet and 10 feet. A table or figure with the observed or calculated saturated zone thicknesses should be added to back up this assertion. Comment applies to Section 4.1 and throughout all calculations.
20. Page 23, Section 3.8, Bullet 5 – Change “and only slightly exceed the USEPA Region 3, 6, 9 PGW-MCL value for TCE of 0.0018 mg/kg” to “but they exceed the USEPA Region 3, 6, 9 PGW-MCL value for TCE by an order of magnitude or more in multiple areas”. Most TCE results are one to two orders of magnitude greater than the stated SSL.
21. Page 25, Section 4.1, first paragraph, second sentence – The buffering solution has been omitted from the amendments. Please modify the text to specify the buffering solution that will be used.
22. Page 25, Section 4.1, first paragraph, third sentence – The text incorrectly indicates that the “extent and location of TCE within the OU2 overburden aquifer is presented on Figure 6.” The TCE contamination has only been characterized to the 100 $\mu\text{g/L}$ level and additional TCE contamination is likely present in the overburden but not depicted on Figure 6. Modify the text to reflect this.
23. Page 25, Section 4.1, first paragraph, fourth sentence – Add the word “proposed” before EISB treatment area.
24. Pages 25 and 26, Section 4.1, third paragraph – The proposed amendment distribution method does not appear to be the most appropriate to achieve maximum radial distribution. It seems more likely that the amendments will travel downward into bedrock fractures and upward into the disturbed trench materials before they move outward into the undisturbed overburden. While movement along the bedrock/overburden interface is also possible, the document does not describe what mechanism would then drive amendments up into the low permeability contaminated overburden after it has spread along the interface. Please modify the text to address these issues and consider other methods of delivering amendment to the contaminated low permeability overburden areas.
25. Page 26, Section 4.1, EISB Implementation Sequence – The buffering solution has been omitted. Please modify the text to specify the buffering solution that will be used, when it will be added, and how much will be added.

26. Page 27, Section 4.2.2 – Add RCRA requirements as necessary to address possible transportation and disposal of contaminated trench spoils and other waste materials.
27. Page 32, Section 4.3.3, first paragraph, last sentence – Indicate whether flushing will be done with water or whether some amendment will be added.
28. Page 35, Section 5.1, fourth bullet – The design assumes that water in well RI27D is appropriate for use in preparing the amendment solution. The text should indicate the basis for this assumption. Has testing of this well been completed to confirm this assumption? If not, when will such testing be performed? If so, when was the well sampled, and do the analytical results demonstrate that the groundwater will be suitable for use as makeup water?
29. Page 35, Section 5.1, fifth through eighth bullets – When will these assumptions be confirmed? At the 60% design stage, these factors should be known quantities.
30. Page 37, Section 5.1.2 – Per page 36, 11.2 EVO batches will be injected through the infiltration trench. After multiple batches have been injected, one batch will be bioaugmented and then the remaining batches will be injected. How will the timing of the bioaugmented batch be determined? Will it be based on field parameter monitoring in the overburden wells located near the trench centerline?
31. Page 38, Section 5.2.1, third paragraph, second sentence – Given that geotechnical analysis was conducted on only one sample from one boring, how was the determination made that the “overburden soil is consistent across the Site”? Provide the basis of this determination.
32. Page 38, Section 5.2.1, third paragraph – Describe the lithology and soil characteristics of the “zone of unquantified thickness”.
33. Page 42, Section 8.1 – The first paragraph identifies installation of 10 new overburden wells, but 11 new overburden wells are specified in Section 8.2.1. Please resolve this discrepancy.
34. Page 43, Section 8.2.1, first bullet – Reword this sentence for clarity. Also, the last well should be 25 ft (not 20 ft) from the centerline of the trench according to Drawing 3 and previous discussions with the PRP.
35. Page 45, Section 8.3.2 – Schedule 80 PVC is not required for these well depths. Explain the need for this material.
36. Page 48, Section 8.8, fifth sentence – Eliminate the sentence, “The success of the remedy as a whole is dependent upon successful distribution of the biostimulant.” While the statement is true to some extent, the overall success of the remedy will be to achieve the cleanup requirements specified in the ROD.
37. Figure 8 – Eliminate the BAE and Stabilus labels from the figure. The data, particularly those from the TW03 and TW06 samples, do not support the assignment of different CSIA results to different companies.

38. Appendix H, Drawing 3 – An EISB application well is included outside of the trench on this drawing. Application of amendments through such a well is contrary to the method proposed in Section 4.1. Correct the drawing, or modify the text to be consistent.
39. Appendix H, Drawing 6, EISB Trench Details – Please indicate how far above the bedrock the pea gravel will extend on Section A. Also, on Section A, “clean fill” is shown overlying the pea gravel, but on Section B, either “clean fill or excavated soil” is shown overlying the pea gravel. Please ensure consistency between the two sections.

Please contact me with any questions regarding this letter or any aspect of the North Penn Area 5 RD Oversight project.

Sincerely,

Ex. 4 - CBI

Ex. 4 - CBI
Project Manager

cc: File